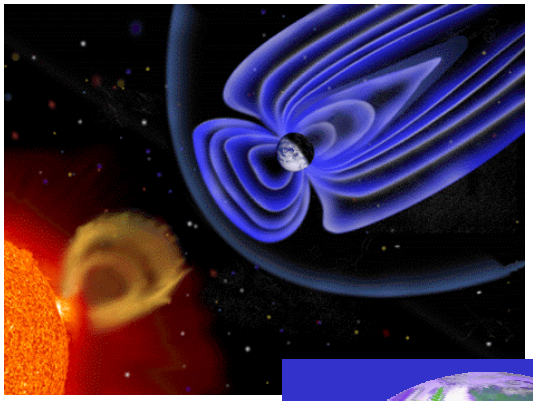
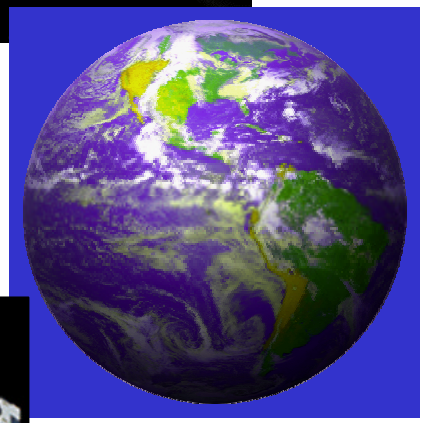




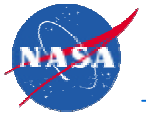
Section 2

Program Goals and Objectives

Goals And Objectives
National Level

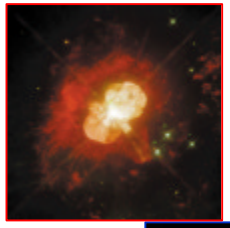
The overarching goal of the NSWP is to achieve an active, synergistic, interagency system to provide timely, accurate, and reliable space environment observations, specifications, and forecasts. Further goals include:

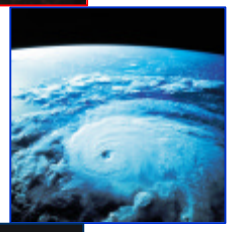
- Advancing observing capabilities and fundamental understanding of processes
- Improving numerical modeling, data processing, and analysis
- Providing a transition of research into operational techniques and algorithms
- Improving forecasting accuracy and reliability as well as space weather products and services, including education and outreach
- Avoiding under- or over-design of technical systems
- Preventing regional blackouts of power utilities
- Mitigating the early demise of multi-million dollar satellites
- Preventing the disruption of communications via satellite, high frequency (HF), and very high frequency (VHF) radio as well as long-line telecommunications
- Avoiding errors in navigation systems
- Preventing excessive radiation doses dangerous to human health



Goals and Objectives
Agency Level

The LWS program is a cross-cutting initiative whose goals and objectives have the following links to each of the four NASA Strategic Enterprises:





- Space Science: LWS quantifies the physics, dynamics, and behavior of the Sun-Earth system over the 11-year solar cycle.
- Earth Science: LWS improves understanding of the effects of solar variability and disturbances on terrestrial climate change.
- Human Exploration and Development: LWS provides advanced warning of energetic particle events that affect the safety of humans.
- Aeronautics and Space Transportation: LWS provides detailed characterization of radiation environments useful in the design of more reliable electronic components for air and space transportation systems.

Space Weather Systems Issues

The user community has identified the following areas of concern associated with space weather effects and their impact on aerospace and ground-based systems:

- Spacecraft reliability
- Safety of spacecraft operations
- Sensor noise and anomalies (science instruments, navigation, etc.)
- Safety of human flight
- Reliability of biological systems (space habitat, bio-electronics, etc.)
- Disruption of navigation systems
- Disruption of communications systems
- Resolution of spacecraft anomalies
- Effects on terrestrial climate and weather
- Effects due to induced currents on ground-based (terrestrial) systems
- Effects of Galactic Cosmic Ray (GCR) induced neutrons on ground-based microelectronics

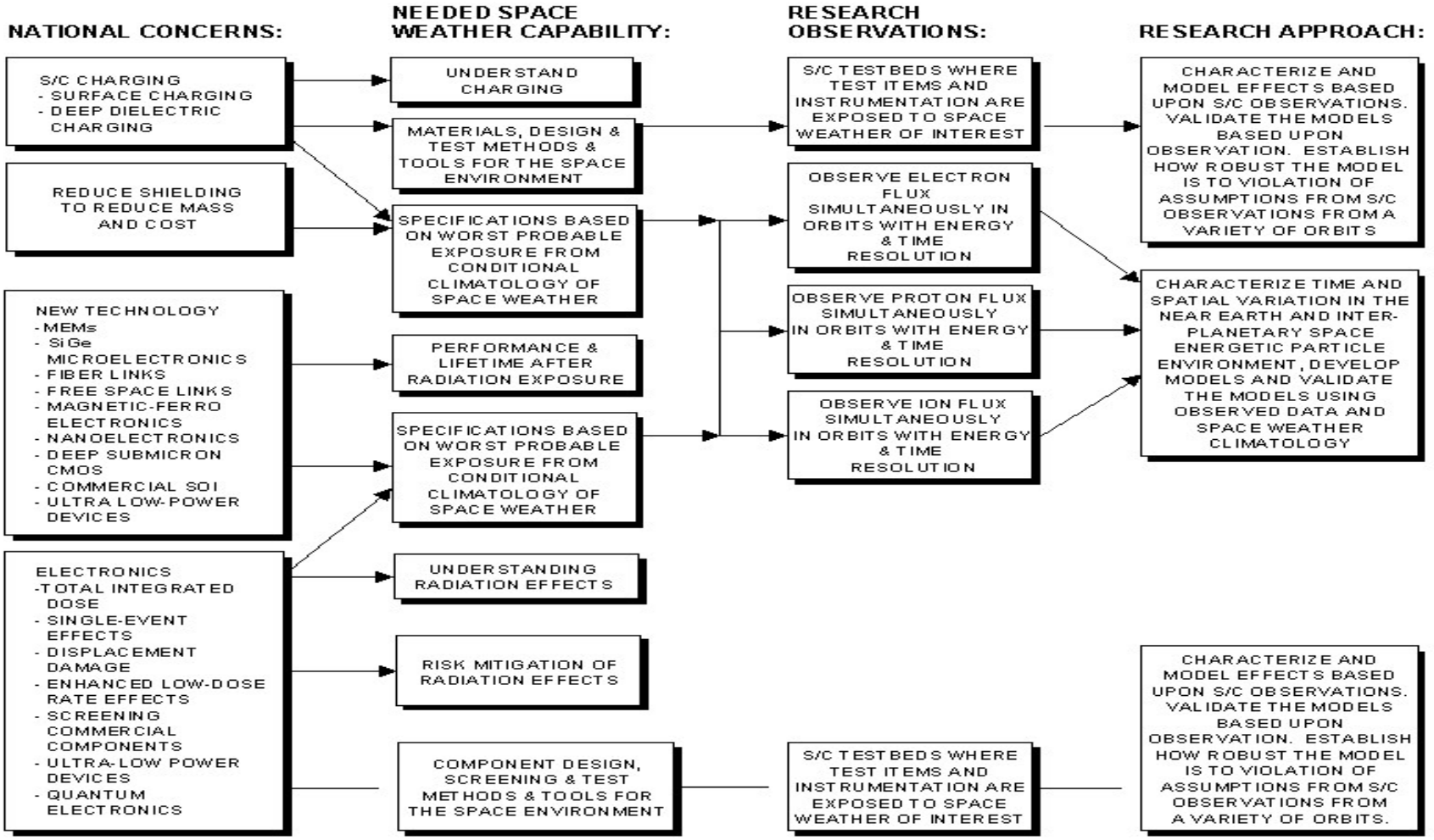
LWS System Contributions

LWS systems will address the national agency and commercial user concerns listed in this matrix.

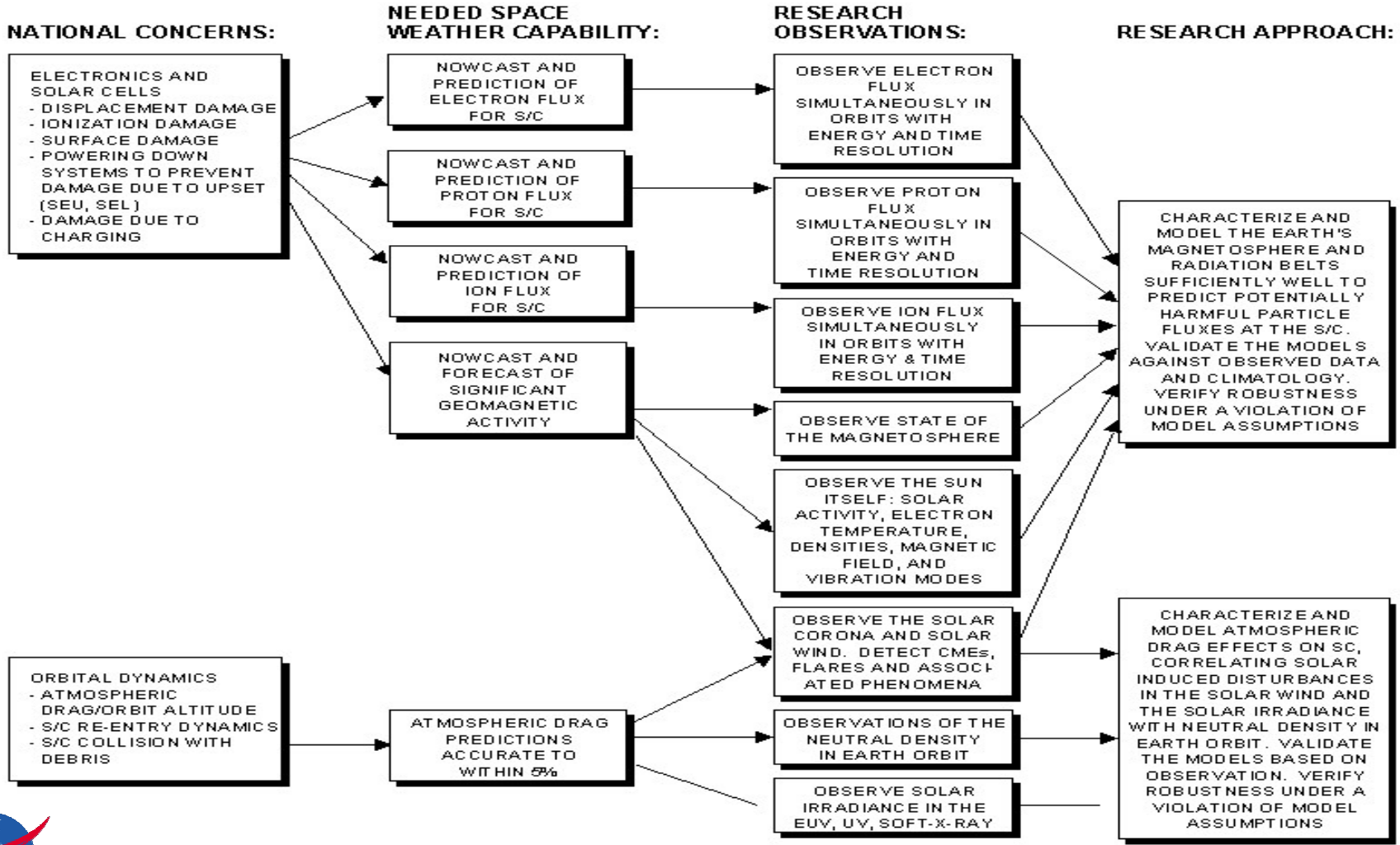
	S/C RELIABILITY	SAFETY OF S/C OPERATIONS	SENSOR NOISE AND ANOMALIES	SAFETY OF HUMAN FLIGHT	RELIABILITY OF BIOLOGICAL SYSTEMS	DISRUPTION OF NAVIGATION SYSTEMS	DISRUPTION OF COMMUNICATIONS SYSTEMS	RESOLUTION OF S/C ANOMALIES	EFFECTS ON TERRESTRIAL CLIMATE AND WEATHER	EFFECTS DUE TO INDUCED CURRENTS ON GROUND-BASED SYSTEMS	EFFECTS OF GCR-INDUCED NEUTRONS ON GROUND-BASED MICROELECTRONICS
NASA ENTERPRISES	X	X	X	X	X	X	X	X	X		
NATIONAL SECURITY AGENCIES	X	X	X	X		X	X	X	X		
AIR TRANSPORT INDUSTRY	X	X		X		X	X				
COMMUNICATIONS INDUSTRY	X	X					X	X			
ENERGY INDUSTRIAL SECTOR										X	
MICROELECTRONIC INDUSTRIAL SECTOR								X			X

Detailed flow-down charts of the intended LWS system contributions are provided in the pages that follow. Note that where an arrow ends at the *space weather capability* column, LWS will not address this issue.

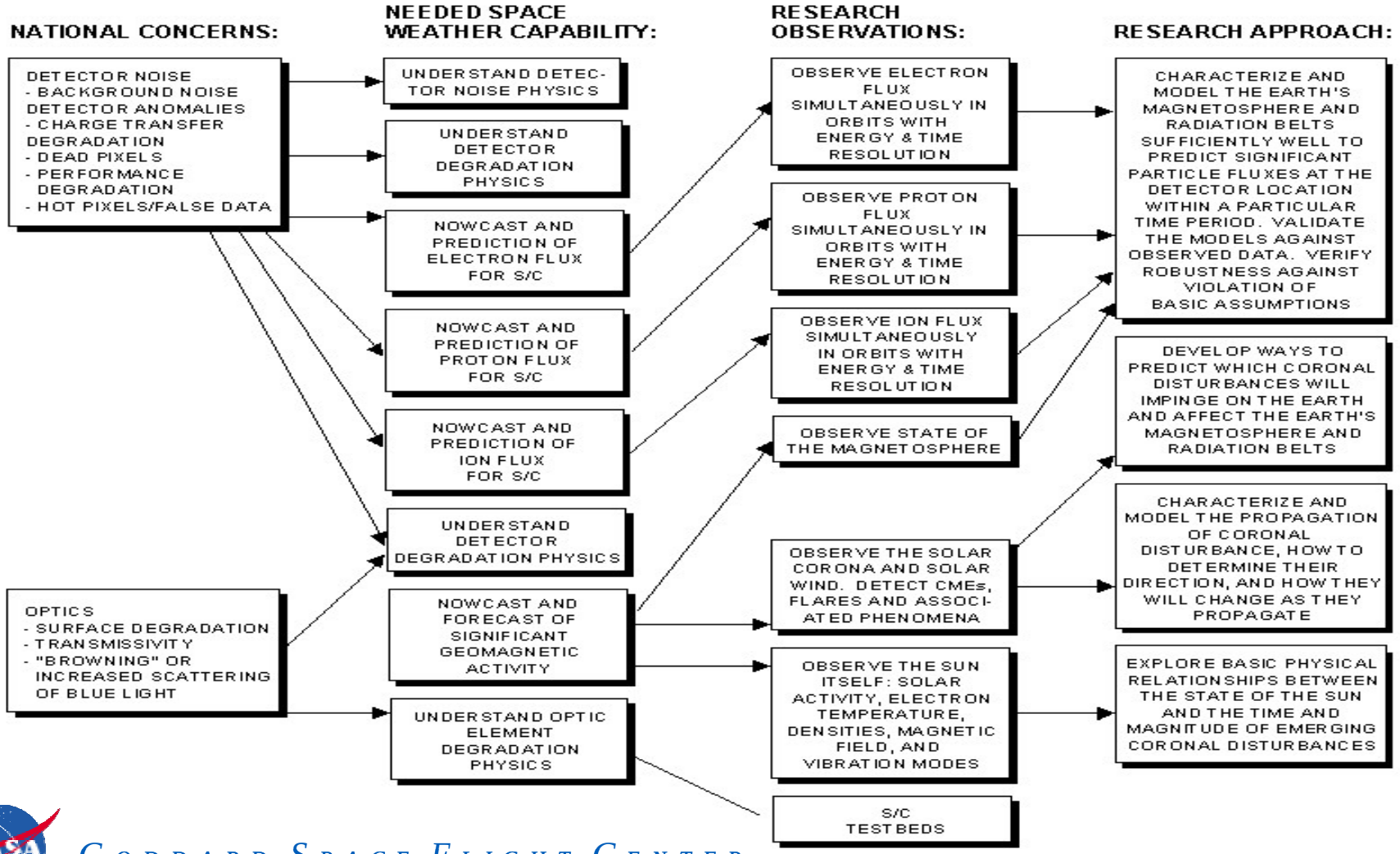
Spacecraft Reliability



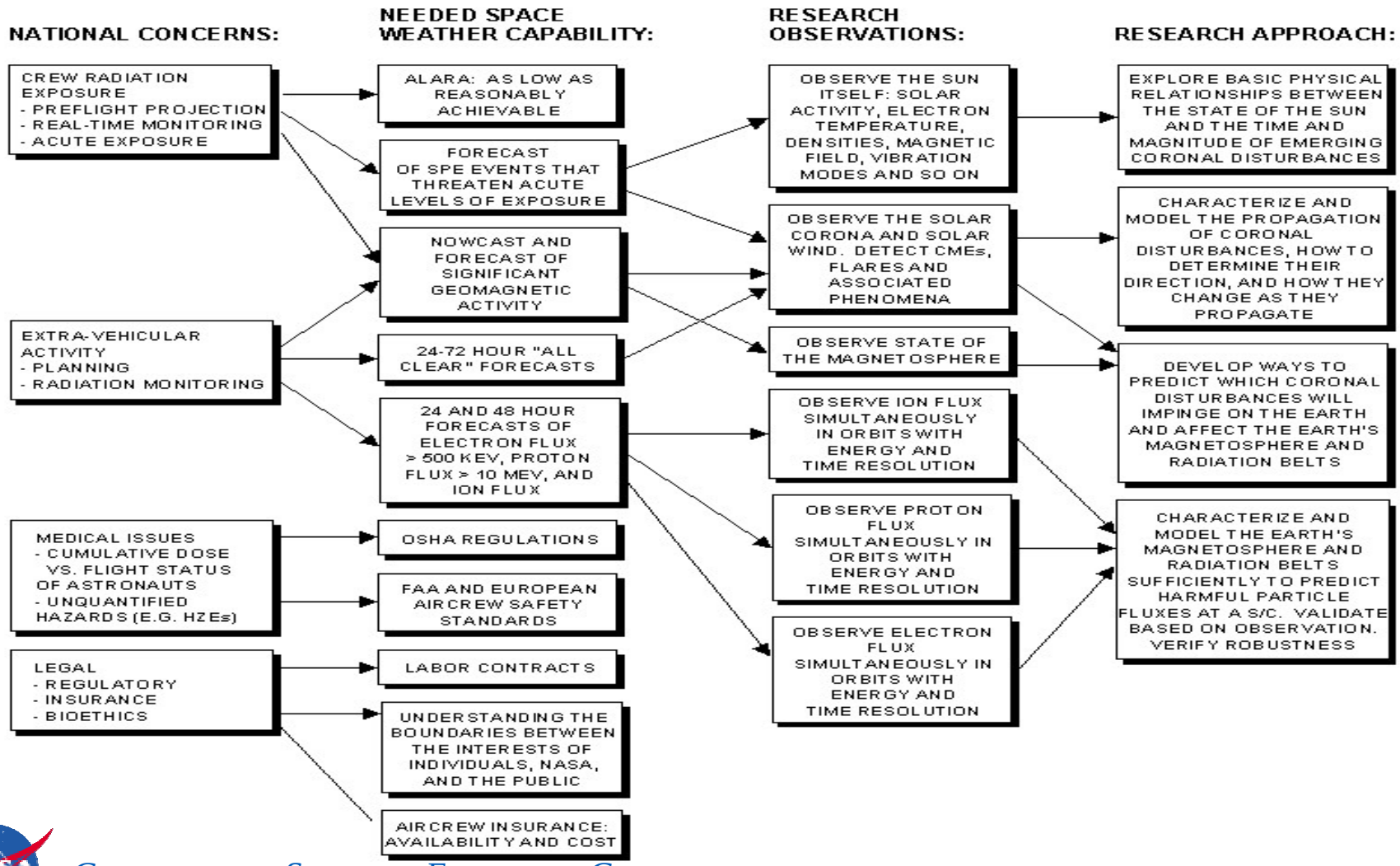
Safety of Spacecraft Operations



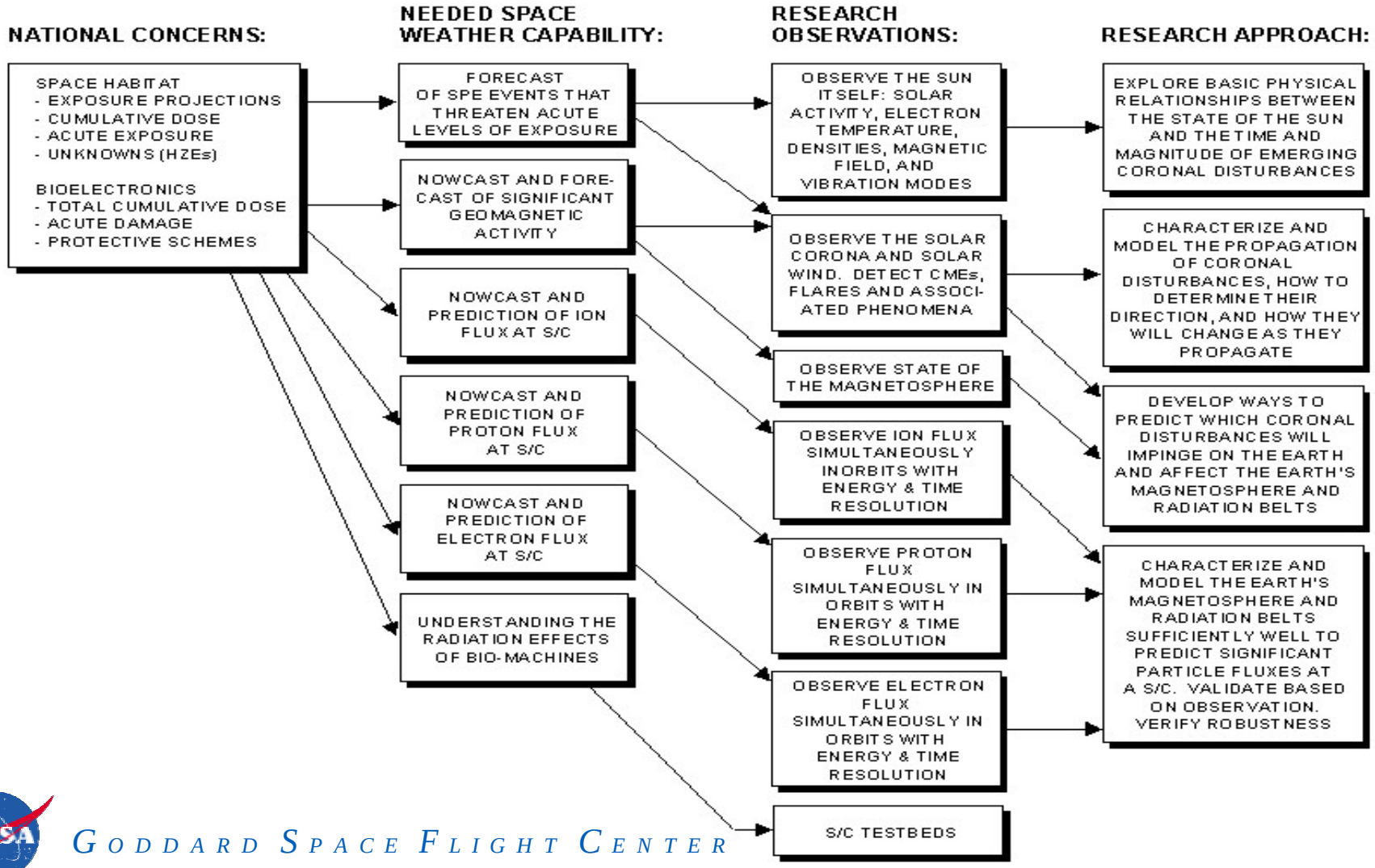
Sensor Noise and Anomalies



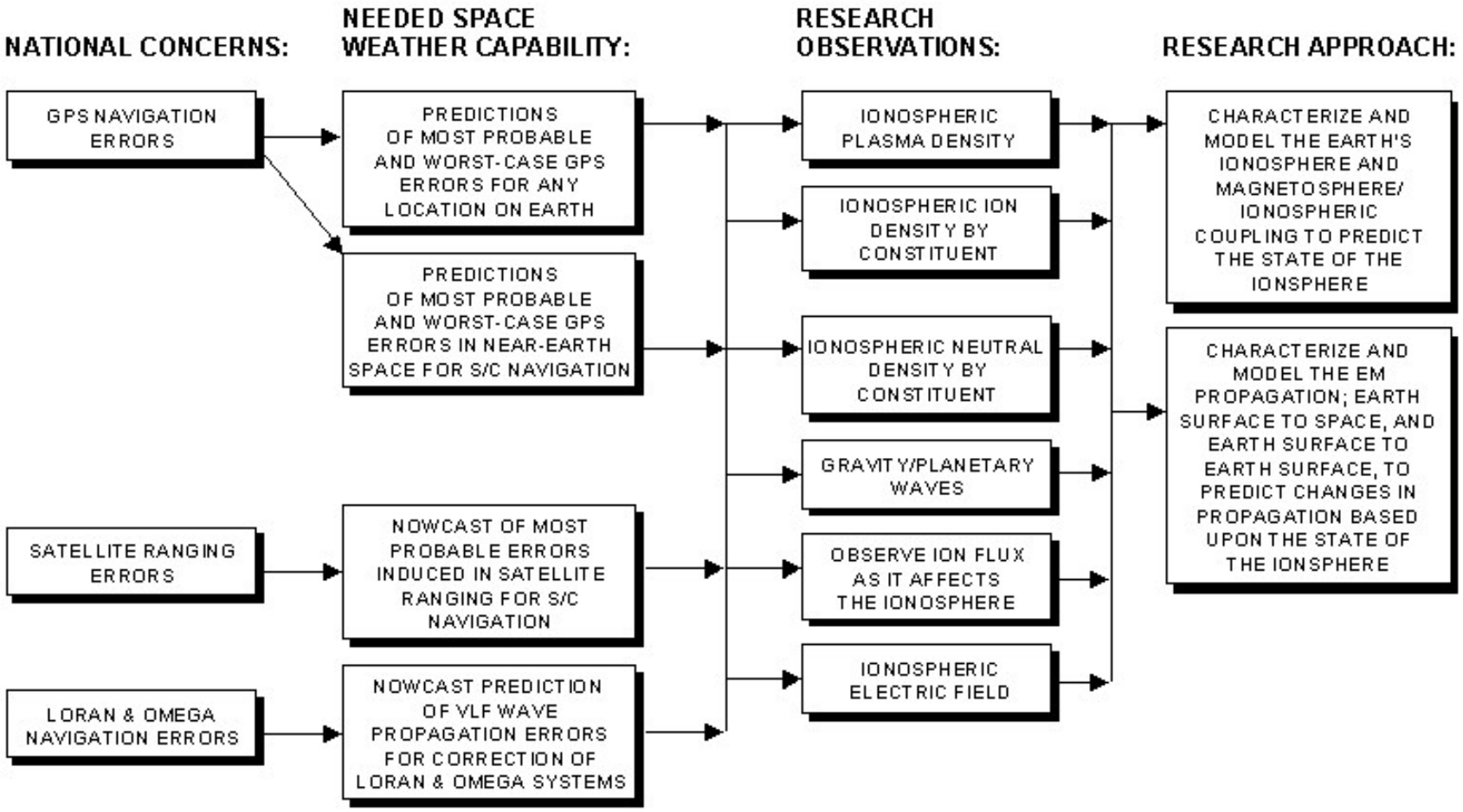
Safety of Human Flight



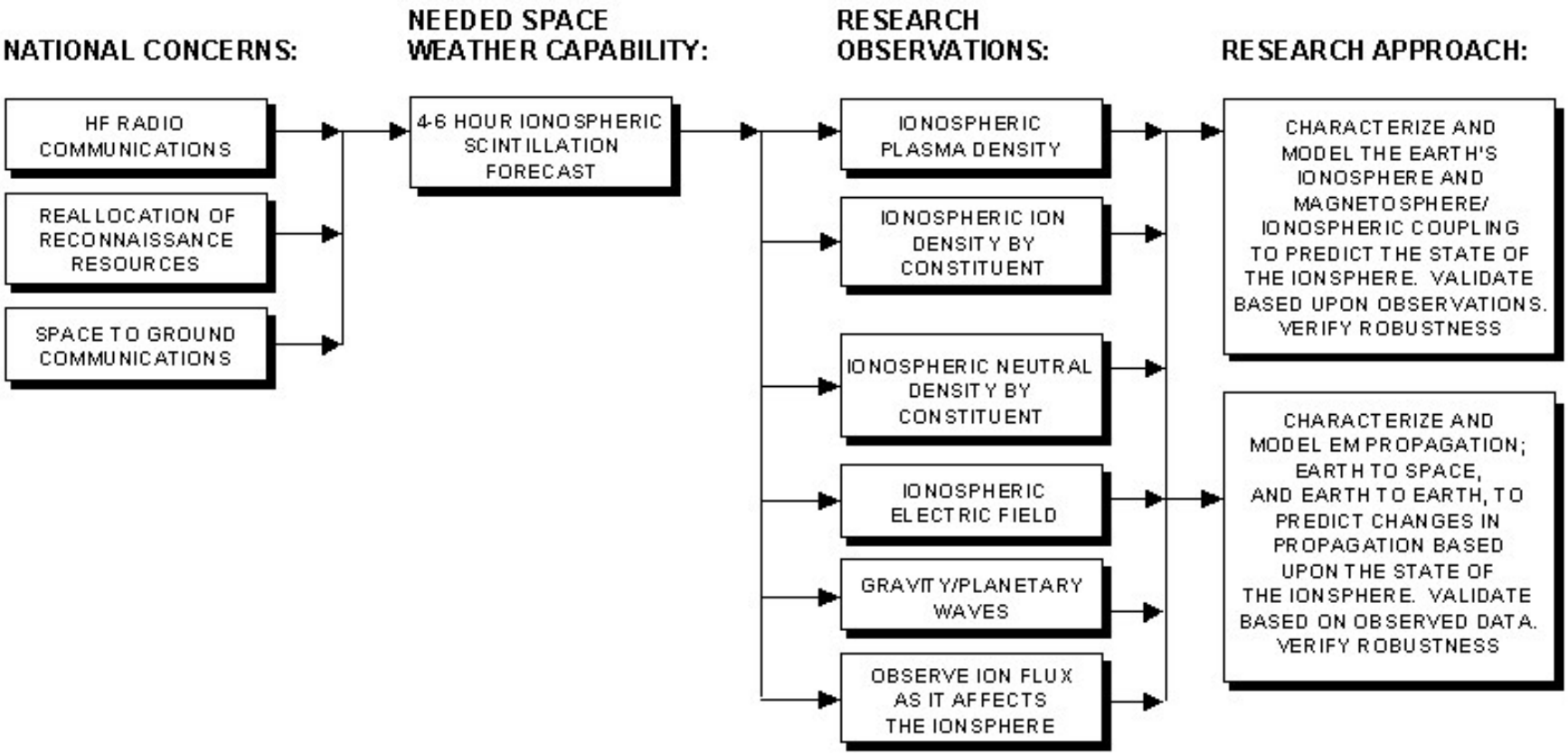
Reliability of Biological Systems



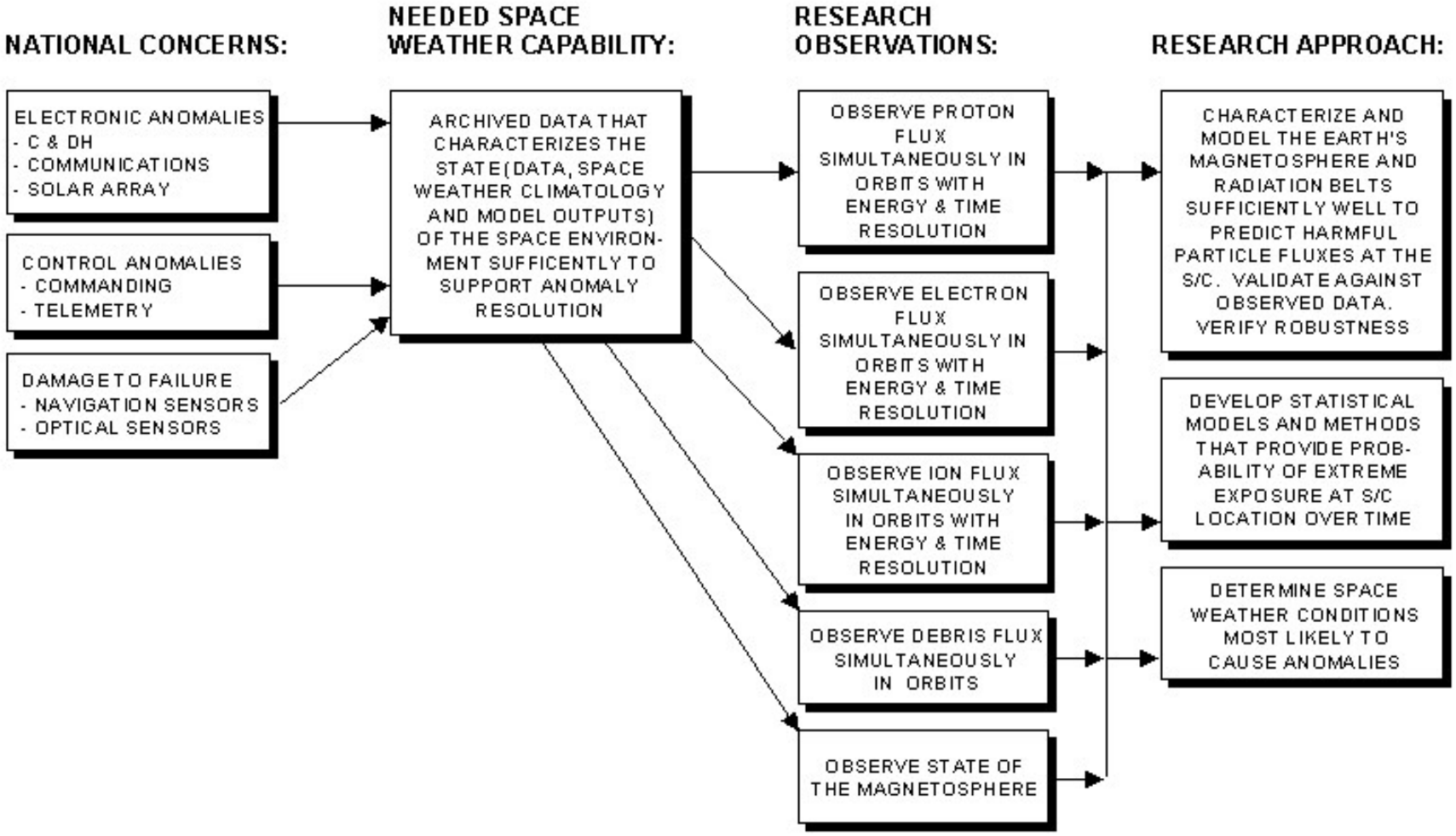
Disruption of Navigation Systems



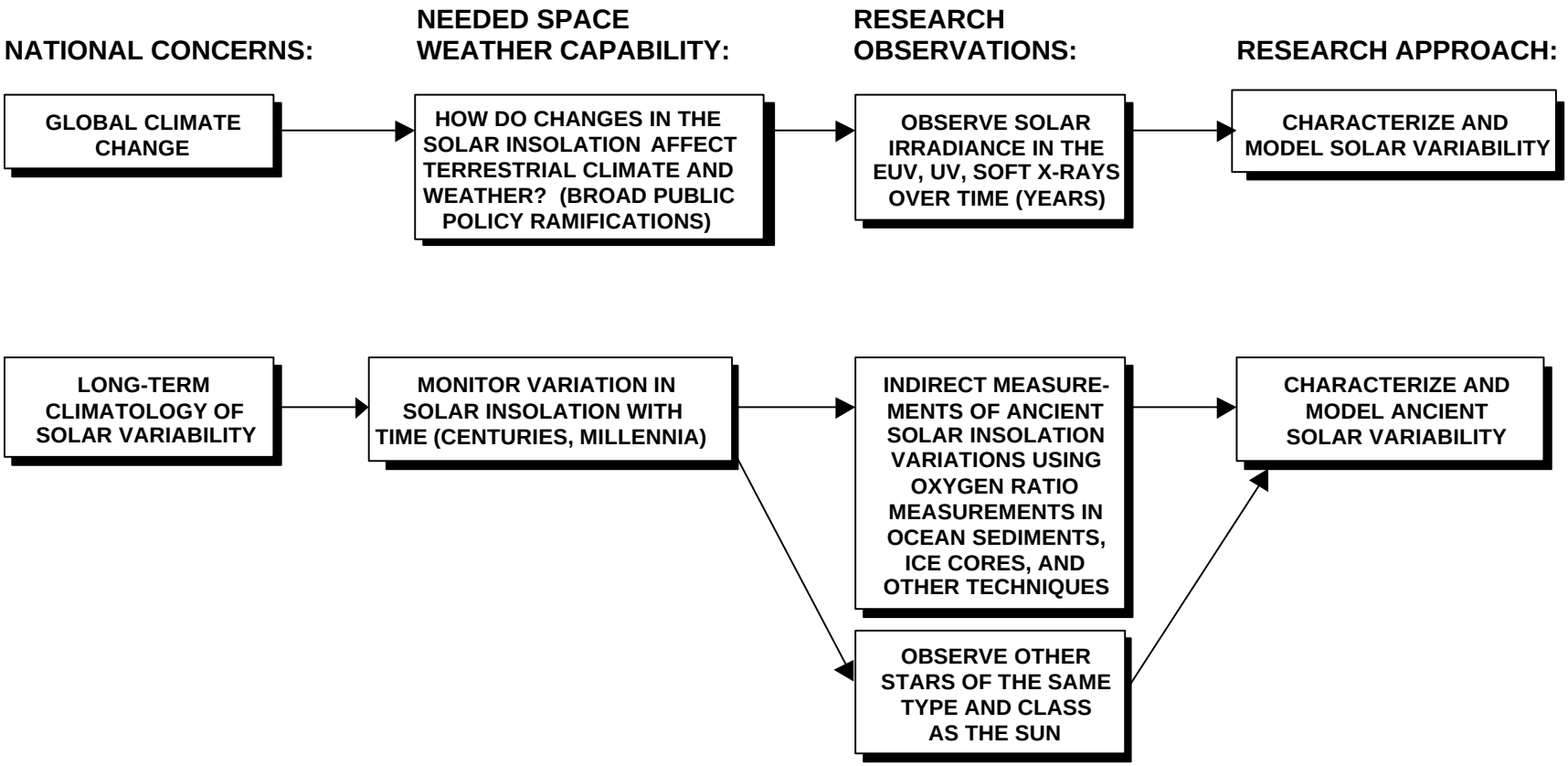
Disruption of Communications Systems



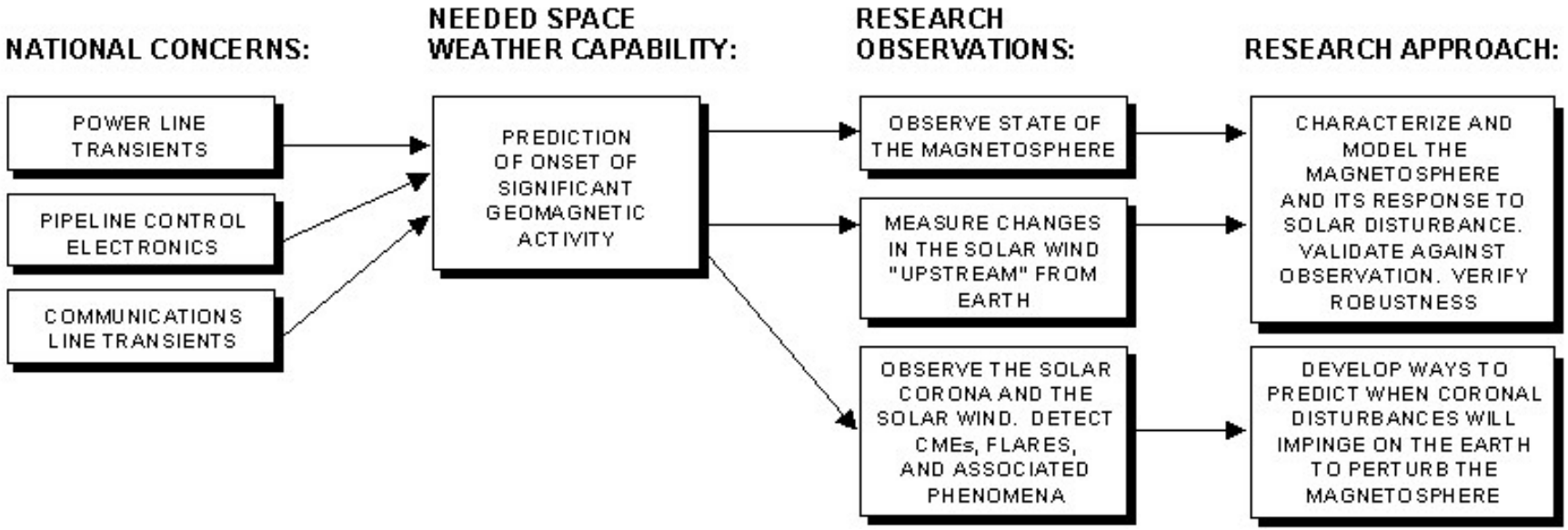
Resolution of Spacecraft Anomalies



Effects on Terrestrial Climate and Weather



Effects Due to Induced Currents on Ground (Terrestrial) Based Systems



GCR Induced Neutrons